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ANNUAL REPORT

OF

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UNIVERSITY

THE DIRECTOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE

FOR

1926-1927.

CAMBRIDGE, U. S. A.:

PRINTED FOR THE MUSEUM

1927.

REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE EAST-ERN TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ, BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM OCTOBER, 1904, TO MARCH, 1905, LIEUTENANT COMMANDER L. M. GARRETT, U. S. N., COMMANDING, IN PREPARATION: —

R. P. BIGELOW. The Stomatopods.

O. CARLGREN. The Actinaria.

H. J. HANSEN. The Cirripeds.

——. The Cephalopods.

C. A. KOFOID. The Protozoa.

P. KRUMBACH. The Sagittae.

G. W. MÜLLER. The Ostracods.

MARY J. RATHBUN. The Crustacea
Decapoda.

——. The Copepods.

——. Pteropods, Heteropods.

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CAMBRIDGE

MUSEUM OF COMPARATIVE ZOÖLOGY.

Faculty.

ABBOTT LAWRENCE LOWELL, *President.*

HENRY P. WALCOTT.

JOHN E. THAYER.

GEORGE R. AGASSIZ.

SAMUEL HENSHAW, *Director.*

Officers.

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SAMUEL GARMAN . . . *Curator of Fishes.*
OUTRAM BANGS . . . *Curator of Birds.*
HUBERT L. CLARK . . . *Curator of Echinoderms.*
HENRY B. BIGELOW . . . *Research Curator in Zoölogy.*
ROBERT W. SAYLES . . . *Curator of the Geological Collections.*
PERCY E. RAYMOND . . . *Curator of Invertebrate Palaeontology.*
THOMAS BARBOUR . . . *Curator of Reptiles and Amphibians.*
JOHN C. PHILLIPS . . . *Research Curator of Birds.*
NATHAN BANKS . . . *Curator of Insects.*
GLOVER M. ALLEN . . . *Curator of Mammals.*
WILLIAM J. CLENCH . . . *Curator of Mollusks.*
ARTHUR LOVERIDGE . . . *Associate in Zoölogy (Reptiles and Amphibians).*
JAMES L. PETERS . . . *Associate in Ornithology.*
GEORGE NELSON . . . *Preparator.*
GERTRUDE A. THURSTON *Secretary.*
ELEANOR K. SWEET . . . *Librarian.*

REGINALD A. DALY . . . *Sturgis Hooper Professor of Geology.*

REPORT.

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE: —

DURING the year 1926-1927 the invested funds of the Museum have increased from \$1,061,092.60 to \$1,068,141.28¹; of this increase \$2,928.70, received from Dr. Thomas Barbour, has been added to the William and Adelaide Barbour Fund, and \$91.36, received from the estate of James Lyman Whitney, has been added to the Maria and James Lyman Whitney Fund, the remainder being unexpended income from restricted funds.

The reports of the several Curators show very plainly that the necessity for additional endowment is today greater than previously; its need has been recognized for years, and emphasized by many visiting committees of the Board of Overseers, perhaps never more clearly than over thirty years ago, when this committee (Messrs. C. F. Folsom, A. Lawrence Lowell, Louis Cabot, F. L. Higginson, and A. T. Cabot) gave the needs in detail, stating that the "scientific work done at the Museum, like its publications, has added fame to the University." It may be noted, moreover, that the *yearly disbursements* of the American museums, whose work and aims are most closely those of the Museum of Comparative Zoölogy, greatly exceed the Museum of Comparative Zoölogy *endowment*.

For the purchase of the La Touche collection of Chinese birds, there has been received from an anonymous friend, and from Dr. J. C. Phillips and Mr. J. E. Thayer \$500 each, and from Mr. F. R. Wulsin \$100; these gifts, together with others previously acknowledged, and a quota from the William Brewster Fund, completed the payment for the series of 5,594 birds received; the remainder of the collection will be forwarded from time to time as Mr. La Touche's study progresses. Though new material must be obtained when available, and to ensure the best service of ambitious curators, it is always a matter of concern when its acquisition outstrips an adequate equipment for its preservation and the opportunity for a

¹ Includes the Sturgis Hooper Fund (\$108,675.84) and the Virginia Barret Gibbs Fund (\$8,807.28) the income of which is not applicable for Museum purposes.

thorough and not too remote investigation of it. Happily the La Touche collection entails no questioning, as it is authoritatively identified and labeled, and the Curator of birds seems always able to find a place for one more specimen.

For many years the late Frederick Channing Bowditch was an earnest and enthusiastic student and collector of Coleoptera, and a liberal contributor to the entomological department of the Museum. Specializing in the large and economically important family of leaf-eating beetles (Chrysomelidae), Mr. Bowditch amassed an enormous series of specimens of great scientific value, which Mrs. Bowditch has most disinterestedly presented to the Museum. Mr. Banks's estimate of the entire Bowditch collection, a most conservative one, places the number of specimens at 300,000, with over 3,000 types.

For the large and remarkable series of Jamaican fossil Echini (21 genera and 45 species, represented by hundreds of specimens), the Museum has to thank Mr. B. W. Arnold. Collaborating with Dr. H. L. Clark in the preparation of a report upon this collection, Mr. Arnold is also providing for its publication as a Museum memoir (22 plates with accompanying text).

The more noteworthy of the many accessions due to Dr. Barbour's interest and liberality are: the Arthur Loveridge African collections; the M. D. Barber collection of mollusks, important in Unionidae and Pleuroceridae; the Malcolm Smith collection of sea snakes, "a large and almost complete series"; part of the Burden collection of reptiles from Komodo, including five of the large Monitor, *Varanus komodoensis* Ouwens; and very considerable series of reptiles, birds, and mammals from the Americas, Europe, Siam, Borneo, New Guinea, Australia and elsewhere. Dr. Barbour also contributed toward the work of the Rock Arboretum expedition to China, securing thereby valuable series of birds and mammals.

The Museum is indebted to Dom. Grégoire Fournier for specimens of Palaeozoic Echini, exceptional for size and preservation, and to M. Victor Van Straelen, aided by M. Eugène Maillieux, for a series of beautiful casts of types, and other specimens of Palaeozoic Echini preserved in Belgian Museums. These important accessions are due to the coöperation of Dr. R. T. Jackson, who improves every opportunity to enhance the value of the Museum's collections.

Dr. Jackson considers the Museum's series of Palaeozoic Echini, (46 species, including the types of 15 species, with casts of 12 additional species and of 12 additional types), the most important extant.

Of the more important accessions not already referred to, the following may be mentioned: —

From Prof. W. M. Wheeler, plaster casts (Carl E. Akeley, *fecit*) of the hands and foot of a Gorilla.

From the American Museum of Natural History, a representative series of Chinese rodents, received in return for Dr. Allen's reports upon the mammals collected by the Andrews expeditions to China.

From Mr. J. E. Thayer, a collection of mammals and birds collected in Mexico and prepared by Mr. W. W. Brown, Jr.

From Dr. L. C. Sanford, a specimen of *Drepanis pacifica* (Gmelin), in exchange for a specimen of *Cirridops annae* (Dole).

From Mr. F. C. Carnochan, a collection of Coleoptera.

From Mr. W. J. Clench, a collection, "some 6,000 lots" of mollusks.

From the South Australian Museum, a large series of echinoderms, received in return for Dr. Clark's work upon the same.

From Dr. Theodor Mortensen, a collection of echinoderms, received in exchange.

Gifts for present use have contributed toward the salaries of assistants working upon the collections, and for the acquisition of collections; a number of unofficial donations have provided for needed equipment and for additional collections.

The generosity of Dr. Edward Wigglesworth ensures the publication, as a Museum memoir, of the valuable report on the geology of Cape Cod and neighbouring islands, prepared for the U. S. Geological Survey by the late J. B. Woodworth and Edward Wigglesworth.

To Miss Elizabeth B. Bryant and Dr. Afranio do Amaral the Museum is indebted for curatorial work upon its collections of spiders and reptiles.

Dr. G. M. Allen, during four months' work as a member of Dr. R. P. Strong's Liberian expedition, secured a considerable series of mammals and birds, together with a number of reptiles and other vertebrates. A report upon this collection is in preparation.

At the conclusion of his service with the Chrysler-Smithsonian expedition to Africa, Mr. Arthur Loveridge made large collections in Tanganyika, which, with those made previously during several years' residence in East Africa, evidence great ability as a collector and preparator, and an adaptiveness to the ways of primitive people. Mr. Loveridge's private collection contains representative material of most of the larger groups of animals, and is especially rich in insects; reptiles, birds, and mammals. For both the 1926 field-work of Mr. Loveridge and for his private collection the Museum is indebted to Dr. Thomas Barbour.

Prof. P. E. Raymond, once more in charge of the Harvard Summer School of Field Geology, worked during July among the Canadian Rockies. The instructor in the course, Mr. D. D. Reynolds, and eight students coöperating with Professor Raymond, secured some remarkably good material from the Middle Cambrian of British Columbia. The notably cordial relations between Professor Raymond and his students redound advantageously to the Museum, as the latter are always willing to forego all claim to valuable specimens personally collected and of interest to themselves. With Mr. H. C. Stetson, Professor Raymond worked during two trips in the Connecticut Valley, securing material at Sunderland and at Bernardston.

The Library contains 65,372 volumes and 74,325 pamphlets; 1,393 volumes, and 1,844 pamphlets have been added during the year.

The publications for the year include one number of the *Memoirs*, five numbers of the *Bulletin* and the *Annual Report*, a total of 338 (120 quarto and 218 octavo) pages, illustrated by 31 (24 quarto and 7 octavo) plates. The following is the status of five *Memoirs* in course of publication: — Clark-Arnold, *Fossil Echini*, 156 pp. ms. in galley proof; 22 plates printed. — Eigenmann, *American Characins*, 230 pp. ms. edited in part; 11 plates printed. — Kofoed, *ALBATROSS Dinoflagellates*, 2,125 pp. ms. in galley to ms. p. 501, balance edited in part; 31 plates printed, 103 text figures, blocks received. — Verrill, *BLAKE Alcyonarians*, 1,158 pp. ms. edited in part; 140 plates printed. — Woodworth-Wigglesworth, *Geology of Cape Cod*, 783 pp. ms. edited in part; 45 plates, 27 printed.

SAMUEL HENSHAW, *Director*.

REPORT ON THE MAMMALS.

BY GLOVER M. ALLEN.

The year ending August 1, 1927, has been noteworthy for the number and value of the accessions. Some 1,182 specimens, skins and skulls, have been catalogued and identified, and a considerable number still remain to be organized.

From June 12 to December 8, I was absent from Cambridge, accompanying the expedition of the Harvard Institute for Tropical Biology and Medicine to Liberia. Under the leadership of Dr. R. P. Strong, the expedition spent over four months in Liberia, journeying across the country on foot to its eastern border. In this area of heavy forest some 200 mammals were collected; these are in part identified. I have also a report on the birds partly prepared.

Col. J. E. Thayer has given an additional collection of Mexican mammals (a beautiful series of nearly 200 skins and skulls from San Luis Potosi, prepared by W. W. Brown, Jr.).

Dr. Thomas Barbour has contributed most liberally to the collection. Notable among his gifts are: — series of skins from Chile, including several of the small, primitive deer, *Pudua pudu* (Molina); a representative series of Irish mammals; specimens from Siam, Borneo, and New Guinea, adding many species to the collection; and particularly the beautiful series of East African mammals collected by Mr. Arthur Loveridge, in part comprising his private collection, assembled during his several years' residence in that country, and in part the result of his work for the Museum in 1926. A joint report on the latter is nearly finished, and the entire series makes the Museum's East African representation a very rich one. Dr. Barbour has also continued his gift of the set of cards recording recent mammalian literature.

Other collections, received during the year, are: — those from the Congo, through Dr. R. P. Strong's expedition, including a fine gorilla and skeleton, secured by Mr. H. J. Coolidge, Jr.; a number of

Chinese mammals from the Rock expedition; a collection from the Cameroons (George Schwab); a series of skins and skulls of small mammals from Argentina (purchased); an excellent representation of Chinese rodents from the American Museum of Natural History; and a number of skeletal remains of Indian dogs and other mammals from the excavations of the ruins of Pueblo Bonito, New Mexico, through Dr. N. M. Judd, in return for identifying the collection.

Other donations of value are from: — Mrs. S. P. Teare, an East African lynx; Miss Ruth Whitman, specimens from northern Maine; Manton Copeland, two *Myotis*; J. L. Peters, skins from Harvard, Mass.; J. C. Phillips, a deer from North Carolina; P. T. L. Putnam, two species from New Guinea; A. de C. Sowerby, two species of *Rattus* from China; Oldfield Thomas, bats from Peru; Josselyn Van Tyne, bats from Panama.

Exchanges have been made with the Kansas University Museum of Natural History, the Russian Academy of Sciences, and the Zoölogical Museum of the University of Moscow. Material has been loaned for study to six persons.

Some 160 skins, ranging in size from a marmot to the larger antelopes, and including all the monkeys and antelopes secured during the Liberian expedition, have been tanned, and are available for study.

REPORT ON THE BIRDS.

BY OUTRAM BANGS.

The year has been an unusually fruitful one, and a number of large collections of much interest have been received. The total of specimens acquired is 11,034. This includes eighteen genera, and several hundred species and subspecies new to the collection.

Most important is the La Touche collection of Chinese birds, secured through the generosity of a number of friends of the Museum. The collection, made during thirty odd years of residence in China, is nearly complete, as far as eastern China is concerned, and contains, besides, many very rare species, actual types of upwards of eighty forms. Two thirds (5,594 specimens), has now been received, and the others will come as rapidly as the studies upon the remaining groups are completed.

Another very valuable addition is the private collection of Mr. Arthur Loveridge, of birds of East Africa, numbering over 1,500 specimens (770 species and subspecies), presented by Dr. Thomas Barbour. Mr. Loveridge, after his work with the Smithsonian-Chrysler expedition to East Africa was finished, collected for the Museum 379 birds. This lot has been worked up by Dr. Herbert Friedmann.

Through the generosity of Dr. Barbour, Dr. J. E. Rock had the assistance of a trained Chinese collector, while exploring the forests of western Kansu and eastern Koko Nor, for the Arnold Arboretum. A first instalment, 931 birds, of this most valuable collection, has been received, and the second and last is safely in America, though not received at the Museum. A report upon the collection, by Mr. Peters and myself, is in preparation.

Dr. G. M. Allen accompanied the Harvard expedition to Liberia, and, with the assistance of Mr. Loring Whitman, secured 462 specimens. Some of Mr. Whitman's collection was made in the Belgian Congo.

Other important gifts include:—fifteen sea birds from the American Museum of Natural History (Whitney South Sea expedition); 258 birds from Cuba, twenty-three from Chile, twenty from Siberia and Russia, 241 from Ireland (B. T. Gault, coll.), 112 from Marotua Island and 320 from Borneo (Eric Mjöberg, coll.), from Thomas Barbour; ninety-four North American birds from Dwight Blaney; 152 birds from Almirante, Panama (H. Wedel, coll.), and nine birds from Swan Island (Niol Wilson, coll.), from F. H. Kennard; 110 North American birds from D. H. Linder; seventy-six birds from San Luis Potosi, Mexico (W. W. Brown, Jr., coll.), from J. E. Thayer; also small series or single specimens from F. H. Allen, Griffing Bancroft, Outram Bangs, Thomas Barbour, A. C. Bent, H. B. Bigelow, R. D. Camp, F. M. Chapman, P. J. Darlington, Jr., H. L. Ferguson, E. H. Forbush, Joseph Grinnell, Samuel Henshaw, A. Jorgenssen, F. H. Kennard, C. D. Klotz, Walter Koelz, Arthur Loveridge, F. G. Palmer, P. T. L. Putnam, Wirt Robinson, William Rowan, G. E. Smith, and the United States National Museum.

One hundred and forty-six birds from the Cameroons were purchased of Mr. George Schwab.

A large number of exchanges with Museums and private collectors have been made, 344 specimens having been received in this way, and much material has been loaned.

Mr. J. L. Peters has continued his work on the card catalogue of the birds contained in the collection. This year, however, much of his time has been given to routine work.

Mr. A. C. Bent, Dr. Herbert Friedmann, and Mr. F. H. Kennard have done much work in the department.

REPORT ON THE REPTILES AND AMPHIBIANS.

BY THOMAS BARBOUR.

During the past year the number of new species added to the collection was not quite as large as was added the year before, but in spite of this the total number now available for study represents almost exactly the number which was known when the last edition of the British Museum Catalogue (1896) was completed by Boulenger.

During the year Mr. Brooks returned from his fruitful trip to Australia with a large and welcome series. Additional material was received from Mr. George Schwab in the Cameroons and further collections came from Guatemala (H. E. Anthony, purchased), Mexico (W. W. Brown, Jr., purchased), Cuba (P. J. Darlington, Jr., gift), Borneo (Eric Mjöberg, purchased). The great collection made by Mr. Loveridge in Tanganyika Territory was received, but is only partially worked up. A large collection of snakes made by the Health Department of the Panama Canal Zone has been studied by Dr. Afranio do Amaral, who has assisted greatly in the identification of other neotropical accessions. Dr. Malcolm Smith's collection of sea snakes, which was very large and almost complete, has been purchased, as also a considerable part of the collection made during W. D. Burden's journey to Komodo Island. This collection included five of the large Monitors. Mr. P. T. L. Putnam has also given us a nice lot of reptiles and amphibians, taken during his recent journey to Merauke, Southwest New Guinea.

During several years past the University of Michigan Museum has sent the M. C. Z. all duplicate material which they believed might be of value here, and the M. C. Z. has reciprocated fairly.

I was absent from February 1 until nearly June 1, partially owing to illness and because I went as usual to Cuba and Central America. I spent some time, also, assisting in the organization of the Antivenin Institute of America, of which Dr. Amaral is now in charge.

Exchanges were completed with eleven Museums and gifts were received from twenty-two individuals. The collections have been more than usually used by visiting investigators, working in Cambridge, and through material loaned.

A census of the collection is appended: —

	Genera	Species	Gain Genera	Gain Species
Rhynchocephalia	1	1	0	0
Crocodilia	6	19	0	0
Chelonia	55	172	0	2
Lacertilia	268	1,658	11	41
Ophidia	288	1,169	11	36
Amphibia	202	1,054	2	31
	<hr/>	<hr/>	<hr/>	<hr/>
Totals	820	4,073	24	110

REPORT ON THE ENTOMOLOGICAL DEPARTMENT.

BY NATHAN BANKS.

The outstanding accession of the year is the great collection of Coleoptera of the late Mr. F. C. Bowditch, presented by Mrs. Bowditch. Based on the G. D. Smith collection, Mr. Bowditch added material collected by himself, and purchased numerous collections. At first a general collection, in later years Mr. Bowditch specialized in the Chrysomelidae, and bought much valuable material, notably the first Jacoby collection, and the Tring Museum series, making thereby the largest series of Chrysomelidae ever accumulated by one person. I estimate that there are fully 300,000 specimens, and the types of more than 3,000 species.

Another large collection is the insects obtained by Mr. Arthur Loveridge during ten years' stay in East Africa, presented by Dr. Barbour. There are about 20,000 specimens, the butterflies and some other groups identified.

Other useful material has been received from Messrs. C. F. Baker, Thomas Barbour, F. C. Carpenter, T. D. A. Cockerell, P. J. Darlington, Jr., G. Fairchild, F. C. Fraser, Samuel Henshaw, C. W. Johnson, A. C. Kinsey, Arthur Loveridge, Charles Robertson, George Salt, F. C. Schott, Roland Thaxter, J. B. Wallis, and F. X. Williams.

A large collection of Bolivian Hymenoptera, Homoptera, and Neuroptera was purchased from José Steinbach, also some African insects from George Schwab. A few hundred local insects were added by the Curator.

Trichoptera and Hymenoptera were named for the Ohio State University, Neuroptera for F. M. Schott and F. X. Williams, and fossorial Hymenoptera for the South Dakota Experiment Station. A large collection of Philippine Psammocharidae and Neuroptera, from the Federated Malay Museum, was received for identification.

Returned collections include:—Panama Locustidae, part

(Hebard), Myers's Cuban Mutillidae (Mickel), Odontaeus (Wallis), Myers's Cuban Typhlocybinae (McAtee), Megachile, remainder (Mitchell), exotic Tipulidae (Alexander), Sphex (Fernald), Corixidae (Hungerford), and Panama Apidae, part (Cockerell).

Material loaned includes: — Cuban Asilidae (Bromley), Panama Tipulidae (Alexander), Micropezidae (Cresson), Dolichopodidae (Van Duzee), and several families of Panama Diptera (Curran).

Many Collembola and Acari have been put into double vials for safety, part of the Odonata rearranged, some material in Hymenoptera and Hemiptera identified, over 300 types marked, and studies made on the genera of the Myrmeleonidae. Mr. O. L. Austin, Jr. has spent much time working on the Mallophaga. The usual inspections of the collection show that it is in good condition.

Besides numerous visits from local entomologists, eight others have studied the collection, one, Prof. R. C. Smith of Kansas, staying about a month.

REPORT ON THE MOLLUSKS.

BY WILLIAM J. CLENCH.

A considerable portion of the year has been devoted to determining and cataloguing the A. F. Gray collection, the Curator's collection, and a major part of the year's accessions. Several genera in the main collection have been revised and their nomenclature brought up to date.

Exchanges have been made with thirty-five institutions and individuals, resulting in the addition of 1,986 lots, while 212 lots were received by gift in addition to the two large collections mentioned below.

There have been added twenty-seven genera and 260 species not previously represented in the collection, as well as two holotypes, forty-eight paratypes, and thirteen cotypes.

Through the kindness of Dr. Barbour, two collections were obtained:—one, the Manly D. Barber collection, is very rich in *Unionidae* and *Pleuroceridae*, mainly from Tennessee; the other, a small but very interesting series collected by Mr. Arthur Loveridge in Tanganyika.

The Curator's private collection of some 6,000 lots was donated to the Museum early in the year, and a portion of this has been catalogued and installed in the regular collection.

The Museum is indebted to the following for gifts of material: J. S. Bailey, Thomas Barbour, J. H. Blake, C. T. Brues, A. W. Cheever, P. W. Darlington, Jr., J. A. Dawson, J. H. Emerton, R. T. Jackson, E. C. Jeffrey, J. P. Jones, Benjamin Kropp, E. L. Mark, Theodor Mortensen, George Nelson, W. C. Schroeder and L. E. Wehmeyer.

REPORT ON THE ECHINODERMS.

BY HUBERT L. CLARK.

Aside from routine work in connection with the accessions of the year, and with Miss Deichmann's work on the holothurians, the time has been occupied with the completion of the study of Jamaican fossil Echini, and of the collection of echinoderms (other than holothurians), belonging to the South Australian Museum.

In August, 1926, Dr. Theodor Mortensen spent three weeks studying the collection of Cidaridae. From October to June, Miss Elizabeth Deichmann of Copenhagen studied the holothurians, much of her work serving as the basis for a thesis on the holothurians of the western Atlantic, for which she received the degree of Ph.D. from Radcliffe College in June. While her work is not completed, it has resulted in the discovery of many undescribed species.

The additions total 1,500 specimens of 221 species, representing 142 genera; eighteen genera and seventy-one species are new to the collection, and forty-four species are represented by type material. The largest addition, 699 specimens, was received from the South Australian Museum, in return for the work done on their collection. This fine series includes seven genera and twenty-seven (twenty-two paratypes) species new to the collection. Of the seven genera, two, one a sea-urchin and one a brittle-star, are extraordinary new forms. Another exceptionally valuable series was received from Dr. Mortensen, in exchange with the Copenhagen Museum. This contained 144 specimens (8 genera and 37 species new to the M. C. Z.), notable for their fine condition; eighteen of the species are represented by type material. Mr. Arthur Loveridge collected a considerable number of echinoderms at Dar-es-Salaam, Tanganyika, in November, and, through the generosity of Dr. Thomas Barbour, his earlier East African coast collections have been added to these. The Loveridge collections, (520 specimens), contain one species new

to the Museum. A small collection of twenty-four specimens, received in exchange from the Academy of Sciences, Leningrad, through Dr. A. Djakonov, contains three genera and six species new to the Museum. For the remaining 113 specimens, thanks are due to Señorita Irene Bernasconi and Messrs. B. W. Arnold, W. S. Brooks, R. V. Chamberlin, W. J. Clench, Ulric Dahlgren, R. T. Jackson, P. T. L. Putnam, R. W. Sayles, and W. C. Schroeder.

REPORT ON ZOÖLOGICAL RESEARCH.

BY HENRY B. BIGELOW.

Two accessions of coelenterates deserve mention; series of the Rhizostome Medusa *Rhopilema*, from the late Prof. A. E. Verrill, and of the freshwater Medusa *Craspedacusta*, from the Washington D. C. filter beds, presented by the U. S. National Museum.

Oceanographic exploration, in which the Museum coöperates with the U. S. Bureau of Fisheries and with the International Ice Patrol, has been extended to the Atlantic basin off the northeastern United States. With the aid of a grant from the Milton Fund, Mr. C. Iselin, 2d, under my supervision, ran hydrographic sections of the triangle between Cape Hatteras, Bermuda, and Nova Scotia, during July and August, taking serial records of temperature and salinity at 85 stations. He also dredged around Bermuda, and collected plankton at many of the stations.

In May, the *ALBATROSS II* carried out a general oceanographic and plankton survey of the coast sector between Woods Hole and Delaware Bay, out to the continental slope. Preliminary examination of the towings proves this to have been a year of abundant production of mackerel eggs and larvae, in the southern part of its range.

During the summer, serial temperatures and towings were taken at various localities in the Gulf of Maine, and the tagging of cod and other gadoids, by the Bureau of Fisheries, has been extended to Browns Bank, under Mr. W. C. Schroeder's direction.

I continue to serve as consulting oceanographer to the U. S. Bureau of Fisheries, as scientific adviser to the International Ice Patrol, and as chairman of the North American committee on sheries investigations.

The final report on the exploration of the Gulf of Maine is in press. Otherwise, my time has been devoted to the preparation of

reports on the ARCTURUS Medusae, and on Canadian Atlantic sharks and rays.

Lieut. Commander E. H. Smith has published the oceanographic report on the Ice Patrol of 1926 (Coast Guard Bulletin 15); Mr. C. Iselin, 2d, has completed his report on his explorations of the Labrador current in 1926; and Mr. W. C. Schroeder's account of the biology of the cod of the Nantucket shoals region is nearly ready.

REPORT ON INVERTEBRATE PALAEONTOLOGY.

BY PERCY E. RAYMOND.

Mr. H. C. Stetson and the Curator, in an attempt to add to the collection of fossils from Massachusetts, made two trips to the Connecticut Valley during the year. On the first occasion, Mr. Stetson found an unusually well-preserved specimen of a rare fish, *Seminotus agassizii* (Redfield), at the old locality in the Triassic at Sunderland. This has been placed on exhibition. On the second trip a large collection of brachiopods was obtained from the partially metamorphosed sandstone at Bernardston. Although this locality has been known for fully seventy-five years, the exact age of the rocks has never been ascertained, since few fossils have been collected there. It is hoped that the specimens in the present collection, although distorted, may yield the desired information.

July, 1927, was spent in the Canadian Rockies with the Harvard Summer School of Field Geology. Some remarkably good specimens were obtained, especially from the Middle Cambrian on Burgess Pass, B. C. Some of the best of them were collected and presented to the Museum by the instructor in the course, Mr. Donald D. Reynolds, and the following students: John M. Birdsall, Gilbert K. Brower, Andrew V. Corry, Henry H. Cutler, Ernest B. Dane, Jr., Addison A. Howe, Henry A. Rusch, Jr., and Gerrish Thurber. All these men showed great generosity in parting with rare and valuable specimens of much interest to themselves.

Mr. H. C. Stetson continued his studies of the Anaspida during the year, publishing the results of his discoveries relating to the structure of one of the most remarkable genera, *Lasanius*, in the *Journal of Geology*. He coöperated with the Museum in sharing the expense of reopening one of the old localities in Lanarkshire. The Museum is indebted to Mr. D. Tait of Edinburgh for undertaking this work, and to Director M. MacGregor of the Scottish

Branch of the Geological Survey of Great Britain for making it possible.

Mr. Carey Croneis completed the study of his collections of fossils from the younger Mississippian formations of Arkansas. He is very generously giving the types of the new species of invertebrates to the Museum.

Mr. Ralph Stewart, now at Johns Hopkins University, studied the pelecypods in the J. D. Whitney collection of Mesozoic and Cenozoic fossils from California, finding among them several of Gabb's types.

The Curator undertook the study and relabeling of the Phacopidae, a group of trilobites represented in the collection by over eighty drawers of specimens. This study involved research into so voluminous a literature that it could not be completed, but is well advanced. Mr. J. R. Moseley assisted in this work by undertaking a preliminary study of the American representatives of the family.

In addition to the accessions noted above, specimens have been received by donation from Mr. W. J. Clench, Dr. R. G. Lusk, and Mr. Gordon Bell. About 350 specimens of Triassic ammonites from Nevada were purchased from Mr. Percy Train.

REPORT ON THE GEOLOGICAL COLLECTIONS.

BY ROBERT W. SAYLES.

During the past year the work of the Curator related mainly to the Bermuda collections, and the structure of the seasonal banding in the Squantum slate. The discovery that near the contact of slate and conglomerate in a quarry in Brighton the winter component of the banding was divided into a number of alternating coarse and fine layers, while the summer component was usually one homogeneous layer of sand, led to an examination of the slate close to the tillite at Squantum. In both places the conditions near the tillite contact were identical, the intervals between the components very regular. This regularity and also the regularity in the number of the divisions in the winter components indicates a seasonal interpretation for this banding, a winter broken by thaws and freezes, and of no great severity, and a summer relatively short and hot. In February, a report upon this discovery was sent to the Committee on Sedimentation of the National Research Council.

Specimens of banded slate, sent for examination, were received from Dr. E. J. Wayland, Director of the Geological Survey of Uganda, Africa.

Mr. H. C. Stetson has undertaken the installation of a stratigraphical exhibit of typical fossils.

REPORT OF THE LIBRARIAN.

BY ELEANOR K. SWEET.

During the Museum year from August 1, 1926 to July 31, 1927, inclusive, 1,393 volumes, 1,844 parts of volumes and 1,849 pamphlets have been added to the Library.

The total number of volumes in the Library is 65,372, the total number of pamphlets is 74,325.

Two hundred and eighty-six volumes have been bound; six hundred pamphlets have been separately bound.

The checking of this library's holdings on the National Union List of Serials was completed in June. This work was begun in April, 1924, and has taken much time each month for over three years; it has helped to familiarize the Librarian with many obscure or seldom-used publications; and it has also revealed some lacunae in our files, of which many of the more important ones have been secured.

From the Harvard College Library the Museum has received 179 titles; other contributors are Henry B. Bigelow (203 titles), Samuel Henshaw (143 titles), William J. Clench (119 titles), Nathan Banks (99 titles), William M. Davis (89 titles), George H. Parker (69 titles), John C. Phillips (66 titles), Outram Bangs (60 titles), Thomas Barbour (53 titles), Reginald A. Daly (43 titles), William M. Wheeler (25 titles), Peabody Museum of American Archaeology and Ethnology (20 titles).

PUBLICATIONS

FOR THE YEAR 1926-1927

(1 AUGUST, 1926 — 31 JULY, 1927).

MUSEUM OF COMPARATIVE ZOOLOGY.

BULLETIN: —

Vol. LXVII.

No. 15. Birds from the rain forest region of Vera Cruz. By Outram Bangs and James L. Peters. 20 pp. January, 1927.

No. 16. Some hydroids of South China. By Charles W. Hargitt. 32 pp. 2 plates. May, 1927.

Vol. LXVIII.

No. 1. Revision of the Nearctic Myrmeleonidae. By Nathan Banks. 84 pp. 4 plates. May, 1927.

No. 2. The distribution and relationships of the Trinucleidae. By Henry C. Stetson. 20 pp. 1 plate. July, 1927.

No. 3. Descriptions of new South American fresh-water fishes collected by Dr. Carl Ternetz. By George L. Myers. 32 pp. July, 1927.

MEMOIRS: —

Vol. XLIII.

Part 4. The American Characidae. By Carl H. Eigenmann. 120 pp. 24 plates. May, 1927.

REPORT: —

1925-1926. 30 pp. December, 1926.

ALLEN, G. M.

Birds of an ocean voyage. *Bull. Essex county ornith. club*, December, 1926, 8, p. 5-12.

An interesting deer from Szechwan. *Journ. mammalogy*, February, 1927, 8, p. 62-63.

The range of *Chiroderma isthmicum* Miller. *Journ. mammalogy*, May, 1927, 8, p. 158.

Murid rodents from the Asiatic expeditions. *Amer. mus. novitates*, 31 May, 1927, no. 270, 12 pp.

BANGS, OUTRAM.

The Chinese form of *Grandala*. *Proc. N. E. zoöl. club*, 12 November, 1926, **9**, p. 77-78.

A new form of the Lesser vasa parrot. *Proc. N. E. zoöl. club*, 8 January, 1927, **9**, p. 83-84.

Atthis heloisa morcomi Ridgway, not a valid subspecies. *Condor*, March, 1927, **29**, p. 118-119.

Birds from Maratua Island, off the east coast of Borneo. [With J. L. Peters]. *Occ. papers Boston soc. nat. hist.*, 13 June, 1927, **5**, p. 235-242.

Kennard on snow geese. [With A. C. Bent and J. L. Peters]. *Auk*, July, 1927, **44**, p. 471-472.

See also p. 24, *Bull.* **67**, no. 15.

BANKS, NATHAN.

Several new species of Psammocharidae (Hymenoptera). *Canad. entom.*, August, 1926, **58**, p. 201-203.

Heteroptera or true bugs of eastern North America. By W. S. Blatchley. (Review). *Science*, 10 December, 1926, **64**, p. 578.

[*Myrmecotypus cubanus*, sp. nov.]. *Trans. Ent. soc. London*, 21 December, 1926, **74**, p. 433-434.

The Bowditch collection of Coleoptera. *Entom. news*, March, 1927, **38**, p. 79.

See also p. 24, *Bull.* **68**, no. 1.

BARBOUR, THOMAS.

A remarkable new bird from Cuba. *Proc. N. E. zoöl. club*, 21 October 1926, **9**, p. 73-75.

A new North American snake. [With Afranio do Amaral]. *Proc. N. E. zoöl. club*, 25 December, 1926, **9**, p. 79-81.

Yellow-crowned night heron in New Hampshire. *Auk*, January, 1927, **44**, p. 97.

A museum can even be useful. *Harvard alumni bull.*, February, 1927, **29**, p. 603-604.

Studies on African Ophidia. [With Afranio do Amaral]. *Bull. Antivenin inst. Amer.*, March, 1927, **1**, p. 25-27.

Two more remarkable new birds from Cuba. [With J. L. Peters]. *Proc. N. E. zoöl. club*, 12 May, 1927, **9**, p. 95-97.

BIGELOW, H. B.

Plankton of the offshore waters of the Gulf of Maine. *Bull. U. S. bur. fish.*, 1924, (1926), **40**, pt. 2, 509 pp.

Oceanographic reconnaissance of the northern sector of the Labrador current. [With C. Iselin]. *Science*, 3 June, 1927, **65**, p. 551-552.

Dynamic oceanography of the Gulf of Maine. *Bull. Nat. res. coun.*, July, 1927, no. 61, p. 206-211.

CLARK, H. L.

Notes on a collection of echinoderms from the Australian museum. *Rec. Austral. mus.*, 18 November, 1926, **15**, p. 183-192.

Will science replace religion? *Congregationalist*, 28 April, 1927, **112**, p. 522-523.

Carelessness in nomenclature. *Science*, 10 June, 1927, **65**, p. 571-572.

CLENCH, W. J.

Some notes and a list of shells of Rio, Kentucky. *Nautilus*, October, 1926, **40**, p. 65-67.

Melanoides tuberculata meussoni, new name. *Nautilus*, January, 1927, **40**, p. 101.

A new subgenus and species of *Bulinus* from Japan. *Nautilus*, April, 1927, **40**, p. 121-122.

A new subspecies of *Thais* from Louisiana. *Nautilus*, July, 1927, **41**, p. 6-8.

PETERS, J. L.

The present distribution and status of the Lesser Antillean solitaires. *Auk*, October, 1926, **43**, p. 430-433, pl. 22-23.

Another preoccupied name. *Auk*, October, 1926, **43**, p. 542.

The North American races of *Falco columbarius*. *Bull. Essex county ornith. club*, December, 1926, **8**, p. 20-26.

A revision of the Golden warblers, *Dendroica petechia* (Linné). *Proc. Biol. soc. Washington*, 5 March, 1927, **40**, p. 31-42.

Descriptions of new birds. *Proc. N. E. zoöl. club*, 24 June, 1927, **9**, p. 111-113.

The Virginia nighthawk in the Bahamas. *Auk*, July, 1927, **44**, p. 421.

The rediscovery of *Myiarchus sclateri* Lawr. *Auk*, July, 1927, **44**, p. 422-423.

Streptoprocne semicollaris (De Saussure) in Chihuahua. *Auk*, July, 1927, **44**, p. 424-425.

See also p. 24, *Bull.* **67**, no. 15.

PHILLIPS, J. C.

The Essex county shooting season of 1926. *Bull. Essex county ornith. club*, December, 1926, **8**, p. 27-29.

Success and the birth-rate. *Harvard grad. mag.*, June, 1927, **35**, p. 565-570.

[New England sportsmen's show]. *Auk*, July, 1927, **44**, p. 474-475.

RAYMOND, P. E.

The significance of red color in sediments. *Amer. journ. sci.*, March, 1927, ser. 5, **13**, p. 234-251.

SAYLES, R. W.

Three Pleistocene tills in southern Maine. (Abstract). [With E. V. Antevs]. *Bull. Geol. soc. Amer.*, March, 1927, **38**, p. 142-143.

INVESTED FUNDS OF THE MUSEUM.

IN THE HANDS OF THE TREASURER OF HARVARD COLLEGE.

Gray Fund (1859)	\$50,000.00
Permanent Fund (1859)	117,469.34
Sturgis Hooper Fund (1865)	108,675.84
Humboldt Fund (1869)	9,869.31
Agassiz Memorial Fund (1875)	297,933.10
Teachers and Pupils Fund (1875)	7,594.01
Virginia Barret Gibbs Fund (1892)	8,807.28
Willard Peele Hunnewell Memorial Fund (1901)	5,666.24
Maria Whitney Fund (1907)	8,133.63
Alexander Agassiz Fund (1910)	99,500.00
Alexander Agassiz Expedition Fund (1910)	108,722.46
George Russell Agassiz Fund (1911)	50,000.00
George Russell Agassiz Fund. Special (1912)	50,000.00
Maria Whitney and James Lyman Whitney Fund (1912)	1,290.98
Louis Cabot Fund (1917)	6,401.22
Harvard Endowment Fund (1917)	1,000.00
William and Adelaide Barbour Fund (1923)	25,100.05
William Brewster Fund (1924)	60,821.61
Anonymous No. 7 Fund (1925)	51,156.21
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	\$1,068,141.28

The payments on account of the Museum are made by the Bursar of Harvard University, on vouchers approved by the Director. The accounts are annually examined by a committee of the Overseers. The income of funds which are restricted is annually charged in an analysis of the accounts, with vouchers, to the payment of which the incomes are applicable.

The income of the Gray Fund can be applied to the purchase and maintenance of collections, but not for salaries.

The income of the Humboldt Fund (about \$500.) can be applied for the benefit of one or more students of Natural History, either at the Museum, the United States Fish Commission Station at Woods Hole, the Stations at Bermuda, or the Tortugas.

The income of the Virginia Barret Gibbs Scholarship Fund, of the value of \$400., is assigned annually with the approval of the Faculty of the Museum, on the recommendation of the Professors of Zoölogy and of Comparative Anatomy in Harvard University, "in supporting or assisting to support one or more students who may have shown decided talents in Zoölogy, and preferably in the direction of Marine Zoölogy."

Applications for the tables reserved for advanced students at the Woods Hole Station should be made to the Faculty of the Museum before the 1st of May. Applicants should state their qualifications, and indicate the course of study they intend to pursue.

The income of the Whitney Funds can be applied for the care (binding) and increase of the Whitney Library.

The Alexander Agassiz Expedition Fund was bequeathed by Alexander Agassiz for the publication of reports on collections brought together by the expeditions with which he was connected.

The income of the Louis Cabot Fund can be applied to the purchase of books on travel, sport, and natural history.

The income of the William and Adelaide Barbour Fund is "expended wholly at the discretion of the Director of the Museum of Comparative Zoölogy * * * to increase the collections of the Museum either by exploration or the purchase of desirable material."

Three quarters of the income of the William Brewster Fund can be used for the salary of a competent ornithologist and one quarter "at the discretion of the Director of the Museum for the increase of the collection by purchase, or for the renewal or repair of the cases, or for the publication of matter contained in my manuscripts."

The income of Anonymous No. 7 Fund is devoted to increasing the salaries of such of the curators as the Faculty of the Museum may select.

The following Publications of the Museum of Comparative Zoölogy are in preparation:—

Reports on the Results of Dredging Operations in 1877, 1878, 1879, and 1880, in charge of ALEXANDER AGASSIZ, by the U. S. Coast Survey Steamer "Blake," as follows:—

A. E. VERRILL. The Alcyonaria of the "Blake."

Reports on the Results of the Expedition of 1891 of the U. S. Fish Commission Steamer "Albatross," Lieutenant Commander Z. L. TANNER, U. S. N., commanding, in charge of ALEXANDER AGASSIZ, as follows:—

K. BRANDT. The Sagittae.

K. BRANDT. The Thalassicolae.

O. CARLGREN. The Actinarians.

REINHARD DOHRN. The Eyes of Deep-Sea Crustacea.

H. J. HANSEN. The Cirripeds.

H. J. HANSEN. The Schizopods.

———. The Ascidians.

S. J. HICKSON. The Antipathids.

P. SCHIEMENZ. The Pteropods and Heteropods.

H. B. WARD. The Sipunculids.

Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of ALEXANDER AGASSIZ on the U. S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900, Commander Jefferson F. Moser, U. S. N., commanding, as follows:—

G. W. MÜLLER. The Ostracods.

MARY J. RATHBUN. The Crustacea
Decapoda

———. The Copepods.

L. STEJNEGER. The Reptiles.

———. The Corals, Recent and Fossil.

PUBLICATIONS
OF THE
MUSEUM OF COMPARATIVE ZOÖLOGY
AT HARVARD COLLEGE.

There have been published of the BULLETIN Vols. I. to LIV., LVI. to LXV. and also LXVII.; of the MEMOIRS, Vols. I. to XLII., and also XLIV. to XLIX.

Vols. LV., LXVI. and LXVIII. of the BULLETIN, and Vols. XLIII., L., LI., LII., and LIII. of the MEMOIRS, are now in course of publication.

The BULLETIN and MEMOIRS are devoted to the publication of original work by the Officers of the Museum, of investigations carried on by students and others in the different Laboratories of Natural History, and of work by specialists based upon the Museum Collections and Explorations.

The following publications are in preparation: —

Reports on the Results of Dredging Operations from 1877 to 1880, in charge of Alexander Agassiz, by the U. S. Coast Survey Steamer "Blake," Lieut. Commander C. D. Sigsbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding.

Reports on the Results of the Expedition of 1891 of the U. S. Fish Commission Steamer "Albatross," Lieut. Commander Z. L. Tanner, U. S. N., commanding, in charge of Alexander Agassiz.

Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of Alexander Agassiz, on the U. S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900, Commander Jefferson F. Moser, U. S. N., commanding.

Reports on the Scientific Results of the Expedition to the Eastern Tropical Pacific, in charge of Alexander Agassiz, on the U. S. Fish Commission Steamer "Albatross," from October, 1904, to April, 1905, Lieut. Commander L. M. Garrett, U. S. N., commanding.

These publications are issued in numbers at irregular intervals. Each number of the Bulletin and of the Memoirs is sold separately. A price list of the publications of the Museum will be sent on application to the Director of the Museum of Comparative Zoölogy, Cambridge, Mass.